

**REMARKS**

Claims 1-19 are pending in the present application. Applicant has attached herewith a clean copy of claims 15-19 in the Appendix, as well as the two requested references, as a courtesy to the Examiner. Applicant respectfully requests withdrawal of the rejection, and allowance of the claims.

Applicant thanks the Examiner for the courtesies extended to Applicant's representatives during the personal interview conducted on October 30, 2002, the contents of which are incorporated herein.

**I. Formalities, IDS, Duty of Disclosure, Request for Information**

Applicant thanks the Examiner for providing the Interview Summary dated March 25, 2002, and for acknowledging the PCT application filed on August 8, 1997.

Applicant notes that the Examiner has refused to consider the documents submitted in the IDS submitted on August 18, 1999 and listed at paragraphs 3 and 4 of the Office Action, which were indicated as considered by the Patent Office based on the previous Examiner's initialing of those references on Form PTO-1449. Further, Applicant respectfully submits that as indicated by the attached receipt stamped by OIPE on August 18, 1999, those two references were properly submitted by Applicant with the IDS.

However, it appears that the aforementioned submitted references were separated from this application by the Patent Office. Accordingly, the Examiner has requested information as per paragraphs 11-13 of the Office Action.

As a courtesy to the Examiner and as discussed during the aforementioned personal interview, Applicant has attached herewith the requested additional copies of the two previously

submitted references. Applicant respectfully submits that this submission meets the Examiner's request for information.

Additionally, with respect to the Duty to Disclose under 37 C.F.R. § 1.56 as discussed at paragraphs 7 and 8 of the Office Action, the Examiner notes that Nakajima '341 and '613 were identified by the Examiner as prior art, but were not disclosed in any IDS. Applicant thanks the Examiner for providing this indication.

## **II. Objections**

The Examiner objects to the drawings, specification and claims due to various alleged informalities. Applicant respectfully requests withdrawal of the Examiner's objections in view of the following remarks.

With respect to the drawings, Applicant respectfully submits that Figures 1 and 2 do not merely disclose that which is old, and actually illustrate claimed subject matter that applicant believes to be patentable. For further support of claimed features illustrated in Figures 1 and 2, Applicant directs the Examiner to pages 26 and 27 of the present application.

Further, MPEP §608.02(g) only requires that figures be labeled as prior art if they illustrate that which is old. Applicant respectfully submits that based on the supporting description for the drawings, Figures 1 and 2 do not illustrate only that which is old. Applicant respectfully submits that the apparent resemblance between Figures 1/2 and the figures cited by the Examiner is not based on the figures as interpreted in light of the specification, which provides the support and description for the figures. As discussed during the personal interview,

Applicant submits that this description clearly differentiates those figures from the alleged prior art. Therefore, Applicant respectfully requests withdrawal of the objection to the drawings.

With respect to the specification, the Examiner objects to multiple pages with the same numbers in the specification and to the numbering of multiple claims with the same numbers, and gives full faith and credit to the prior Examiner. Applicant acknowledges that claims 15-19, as amended in the Preliminary Amendment, no longer recite multiple dependency and further, the phrase “storage medium” is used in the preamble of claims 15-19. As per the Examiner’s request and as discussed during the personal interview, Applicant attaches a clean copy of claims 15-19 in the Appendix. Accordingly, Applicant respectfully requests withdrawal of the objections to the specification and the claims.

Additionally, the Examiner objects to the alleged incorporation by reference of essential subject matter in the specification. Applicant respectfully submits that the specification does not explicitly incorporate the six documents by reference. Further, it is submitted that the six cited documents are not essential material. For a definition of “essential” material, Applicant directs the Examiner to MPEP §608.01(p).I.A. Applicant respectfully submits that because it is believed that the specification already discloses all essential material, the citation of the referenced documents incorporates additional non-essential material, as defined in MPEP §608.01(p).I.A (e.g., material for illustrating the background of the invention, or the state of the art).

Additionally, as discussed during the personal interview, Applicant respectfully submits that it would not have been possible for the Examiner to determine whether the materials were essential, since the Examiner did not have access to the two references missing from the Patent

Office's file, which are attached hereto. Applicant respectfully requests that the Examiner withdraw these objections, based on the non-essential material in these references.

Accordingly, Applicant respectfully submits that the incorporation of the non-essential material by reference is proper, and therefore requests withdrawal of the objections to the specification, as well as the drawings as claims for at least the reasons discussed above.

**III. Claims 1-19 are in proper condition under 35 U.S.C. § 112, 1<sup>st</sup> paragraph**

Claims 1-19 stand rejected due to alleged lack of written description and alleged lack of enablement under 35 U.S.C. § 112, 1<sup>st</sup> paragraph. More specifically, the Examiner asserts that the recitation "determine a conversion system" is inadequately described in the specification.

Applicant respectfully submits that the specification provides proper enablement and written description for the foregoing claimed feature. For example, but not by way of limitation, Applicant respectfully refers the Examiner to the paragraph bridging pages 49-50 of the present application, which clearly describes an exemplary, non-limiting embodiment, including (but not limited to) the determination of a conversion system. Applicant respectfully submits that the foregoing cited passage includes sufficient description to meet the written description and enablement requirements of 35 U.S.C. § 112, 1<sup>st</sup> paragraph.

As discussed during the personal interview, Applicant respectfully disagrees with the Examiner's rejection under 35 U.S.C. § 112, 4<sup>th</sup> paragraph, and the Examiner's request that Applicant amend the claims to recite "further comprising" instead of "comprising". Additionally, Applicant respectfully submits that such a request does not form a proper basis for a 35 U.S.C. § 112, 4<sup>th</sup> paragraph rejection, and at most, could only be the basis for an objection to the claims.

With respect to the claim interpretation discussed at paragraphs 33-35 of the Office Action, Applicant refers the Examiner to the Appendix. Also, while the Examiner has noted alleged problematic language with respect to dependent claims 2-9, Applicant respectfully submits that no amendment is required for the objections raised in paragraphs 44, 45, 47, 49, 54, 60, 64 and 70 of the Office Action. More specifically, Applicant respectfully submits that claim 2 is clearly not a substantial duplicate of claim 1. For example, but not by way of limitation, claim 1 does not recite any of the features claimed in step 2 related to a defining the design parameter as a design variable.

Further, Applicant respectfully submits that 35 U.S.C. § 112, 4<sup>th</sup> paragraph does not require use of the term “further” prior to “comprising,” as being applied by the Examiner. It is submitted that the use “wherein” serves to specify a further limitation of the claim from which it depends, and therefore, no further amendment is required to place those claims in proper condition.

Therefore, Applicant respectfully requests withdrawal of the 35 U.S.C. § 112, 1<sup>st</sup> paragraph rejection, and allowance of the claims.

#### **IV. Claims 1-7, 10-13 and 15-19 are novel**

Claims 1-7, 10-13 and 15-19 stand rejected due to alleged anticipation under 35 U.S.C. § 102(e) over Kamegawa et al. (U.S. Patent No. 5,710,718, hereafter “Kamegawa”). Applicant respectfully submits that Kamegawa fails to disclose all of the claimed combinations of features, as required for anticipation rejection under 35 U.S.C. § 102. Thus, Applicant respectfully requests withdrawal of the rejection, and allowance of the claims.

As noted above, Applicant respectfully submits that the Examiner's apparent objections to the dependent claims at paragraphs 44, 45, 47, 49, 54, 60, 64 and 70 are improper, and no amendment is required to place the claims in proper condition. Further, Applicant respectfully submits that the claims are novel over Kamegawa for at least the reasons described in greater detail below.

An exemplary, non-limiting embodiment of the present invention relates to a method of designing a tire. More specifically, the method determines a conversion system in which a non-linear correspondence between design parameters and performances of a tire is established. The parameters may represent a cross-sectional configuration of the tire including (but not limited to) an internal structure and a structure of the tire. Based on the non-linear correspondence, an objective function is determined, followed by the setting of a constraint condition, and accordingly, a design parameter of the tire is determined to optimize objective function by using the aforementioned conversion system to design the tire based on the design parameter of the tire. As disclosed at page 2 of the specification, the related art system uses a genetic algorithm, but encounters the related art "mountain climbing" problem (i.e., the first peak reached may be mistaken for the optimal solution). Applicant notes that the cited reference corresponds to the PCT publication of Kamegawa. Further, the present invention overcomes the related art problems of not being able to find an optimal value in a non-linear analysis.

Kamegawa discloses a method of designing a pneumatic tire. As noted at page 2 of the present application, Kamegawa discloses a mathematical programming method and optimization method using a genetic algorithm, and encounters the aforementioned related art "mountain

climbing” problem, because Kamegawa encounters the related art problem of mistakenly optimizing based on the peak that was first reached, and cannot optimize in a multi-peak, non-linear environment (e.g., antinomic performance). Further, Kamegawa employs deterministic, iterative approaches, as opposed to the claimed predictive approaches. Further, Kamegawa is not suited for optimization in a non-linear environment.

Applicant respectfully submits that Kamegawa fail to disclose or suggest all of the claimed combinations of features. For example, but not by way of limitation, Applicant respectfully submits that Kamegawa fails to disclose (or even suggest) a conversion system establishing a non-linear correspondence between design parameters of a tire and performances of a tire, as recited in independent claims 1, 10 and 15. As noted above, Kamegawa does not disclose optimization in a non-linear environment. Thus, Applicant respectfully requests withdrawal of the anticipation rejection with respect to independent claims 1, 10 and 15.

Claims 2-7 and 9 depend from independent claim 1, claims 11-13 depend from independent claim 10 and claims 16-19 depend from independent claim 15. Applicant respectfully submits that the dependent claims are allowable for at least the same reasons as discussed above with respect to the independent claims from which they depend.

Additionally, Applicant respectfully submits that Kamegawa fails to disclose predicting an amount of change in the design variable, as recited in dependent claims 3, 6 and 18. Applicant notes that step 112 of Kamegawa discloses determining, which is substantively different from predicting. Further, Applicant respectfully disagrees with the Examiner’s assertion that step 110 in Kamegawa discloses “calculating a value of the objective function when the design variable is

changed to correspond to a predicted amount and a value of the constraint condition when the design variable is changed,” as recited in claims 3, 6 and 18. Again, Applicant notes that Kamegawa discloses a determinative model, which is substantially different from a predictive model. Therefore, Kamegawa also does not disclose obtaining a value of the design variable based on predicted and calculated values, as recited in claims 3, 6 and 18. Thus, Applicant respectfully submits that claims 3, 6 and 18 are novel and allowable.

Further, Applicant respectfully submits that Kamegawa fails to disclose that the design parameters are defined as base models to determine a group for selection comprising a plurality of base models, selecting two base models from the groups for selection, as recited in claim 7, 13 and 19. Applicant also respectfully submits that step 204 of Kamegawa (i.e., “mutation”) does not disclose the adaptive function recited in claim 7, 13 and 19. Applicant respectfully reminds the Examiner that all of the claimed features must be anticipated by the cited reference, and that the general disclosure of one portion of a step is insufficient for a proper anticipation rejection.

Also, Applicant respectfully submits that Kamegawa fails to disclose that the conversion system calculation means obtains a non-linear corresponding relation between (a) the design parameters of the tire and a condition to be applied to the tire, and (b) the performances of the tire, as recited in dependent claim 11. Kamegawa fails to disclose a non-linear correspondence relation, and also has the related art problems that result from an inability to optimize under non-linear correspondence conditions, as discussed in greater detail in the present application.

Therefore, Applicant respectfully requests withdrawal of the §102 rejection, and allowance of the claims.



**V. Claims 8 and 14 would not have been obvious**

Claims 8 and 14 stand rejected due to alleged anticipation under 35 U.S.C. § 103(a) over the Examiner's proposed combination of Kamegawa and Tang (U.S. Patent No. 6,061,673). Applicant respectfully submits that the Examiner's proposed combination of references fails to disclose or suggest all of the claimed combinations of features, as required for a prima facie obviousness rejection under 35 U.S.C. § 103(a). Therefore, Applicant respectfully requests withdrawal of the rejection, and allowance of the claims.

Because Tang does not appear to be a reference of record, Applicant's representatives contacted the Examiner in a telephone interview on June 18, 2002, to verify the status of the Tang reference. The Examiner indicated that while he was unable to clarify the situation at that time, he would expeditiously resolve the matter by providing an additional Form PTO-892. Applicant thanks the Examiner for the courtesies extended to Applicant's representatives during the telephone interview, the contents of which are incorporated herein. As indicated during the subsequent personal interview, the Examiner agreed to provide Form PTO-892 with the next correspondence from the Patent Office. Applicant also thanks the Examiner in advance for representing Tang as a reference of record.

Claim 8 depends from independent claim 1 and claim 14 depends from independent claim 10. Applicant respectfully submits that those dependent claims are allowable for at least the same reasons as discussed above with respect to the independent claims from which they depend. Applicant also respectfully submits that claims 8 and 14 are allowable for at least the additional reasons described in greater detail below.

Tang discloses learning methods in binary systems. At Figure 5 and in column 10 of Tang, a multi-layer, feed forward neural network is disclosed. However, Applicant respectfully submits that Tang fails to disclose that the neural network is configured to learn so as to convert design parameters of a tire to performances thereof.

Applicant respectfully submits that the Examiner's proposed combination of references fails to disclose or suggest all of the claimed combinations of features. For example, but not by way of limitation, Applicant respectfully submits that the proposed combination of references fails to disclose or suggest constructing the conversion system with data in a multi-layered feed forward type neural network which has learned to convert the design parameters of the tire to performances thereof, as recited in claims 8 and 14.

The Examiner agrees that Kamegawa fails to disclose a multi-layered feed forward type neural network which has learned to convert the design parameters of the tire to performances thereof, as recited in claims 8 and 14, and proposes to combine Tang into Kamegawa to cure that deficiency. However, Applicant respectfully submits that the proposed combination of Kamegawa and Tang is improper, and even if properly combinable, still fails to disclose or suggest the features recited in claims 8 and 14.

Applicant respectfully submits that one of ordinary skill in the art would not have been motivated to combine Kamegawa and Tang to produce the claimed combination of features. For example, but not by way of limitation, Applicant respectfully submits that Kamegawa discloses a determinative system that does not apply predictive capabilities, and cannot handle non-linear situations (e.g., multiple peaks as discussed above). Thus, there is no motivation to combine

Kamegawa with Tang, which is a non-determinative modeling tool that employs learning methods for binary systems.

Even if Tang were properly combined with Kamegawa, Applicant respectfully submits that the combination of references would not disclose or suggest all of the claimed combination of features recited in claims 8 and 14. For example, but not by way of limitation, Applicant respectfully submits that Tang does not disclose a multi-layered feed forward type neural network that has learned so as to convert the design parameters of the tire to performances thereof, as recited in claims 8 and 14. Applicant respectfully submits that because neither of the references discloses or suggests the aforementioned claimed feature, there is no support for the Examiner's assertion that claims 8 and 14 are rendered obvious.

Applicant notes that because neither reference discloses or suggests that claimed feature, the source of motivation for the Examiner's proposed combination of references is not readily ascertainable from the Office Action. Applicant also reminds the Examiner that using the present claimed invention, as disclosed in the present application, as a motivation for combining references constitutes impermissible hindsight reconstruction.

Therefore, Applicant respectfully requests withdrawal of the §103 rejection, and allowance of the claims.

## **VI. Conclusion**

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

Amendment Under 37 C.F.R. § 1.111  
U.S. Appln. No. 09/269,972

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,



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**APPENDIX**  
**CLEAN COPY OF CLAIMS 15-19**

15. A storage medium having a stored optimization analyzing program for design of a tire executed by a computer, wherein the optimization analyzing program is provided to:

determine a non-linear corresponding relation between design parameters of a tire and performances of the tire; determine an objective function which expresses the performances of the tire and determine a constraint condition which constrains an allowable range of at least one of the performances of the tire and manufacturing conditions of the tire; and obtain a design parameter of the tire, which gives an optimum value of the objective function, based on the determined corresponding relation, the objective function, and the constraint condition to design a tire based on the design parameter of the tire.

16. A storage medium having a stored optimization analyzing program for design of a tire according to claim 15, wherein the design of a tire based on the design parameters of the tire comprises: selecting, as a design variable, one of the design parameters of the tire included in the determined corresponding relation based on the determined corresponding relation, the objective function, and the constraint condition; changing a value of the design variable selected from the determined corresponding relation until the optimum value of the objective function is given while considering the constraint condition; and designing the tire based on the design parameter of the tire obtained by the design variable which gives the optimum value of the objective function.

17. A storage medium having a stored optimization analyzing program for design of a tire according to claim 16, wherein the constraint condition constrains an allowable range of at least

one of the performances of the tire other than the determined objective function and the design parameters of the tire.

18. A storage medium having a stored optimization analyzing program for design of a tire according to claim 16, wherein the change of the design variable is effected by:

predicting an amount of change in the design variable which gives the optimum value of the objective function while considering the constraint condition based on a sensitivity of the objective function which is a ratio of an amount of change in the objective function to a unit amount of change in the design variable and a sensitivity of the constraint condition which is a ratio of an amount of change in the constraint condition to a unit amount of change in the design variable; calculating a value of the objective function when the design variable is changed to correspond to a predicted amount and a value of the constraint condition when the design variable is changed to correspond to a predicted amount; and changing a value of the design variable to be selected based on the predicted and calculated values until the optimum value of the objective function is given while considering the constraint condition.

19. A storage medium having a stored optimization analyzing program for design of a tire according to claim 16, wherein the design of a tire based on the design parameter of the tire comprises: defining the design parameters of the tire in the determined corresponding relation as base models to determine a group for selection composed of a plurality of base models; determine said objective function, a design variable, a constraint condition, and an adaptive function which can be evaluated from the objective function for each base model in the group for selection; selecting two base models from the groups for selection; effecting at least one of

producing new base models by intersecting the design variables of the selected two base models at a predetermined probability with each other, and producing new base models by modifying in part the design variables of at least one of the two base models; obtaining an objective function, a constraint condition, and an adaptive function of the base model using said conversion system calculation means by changing design variables; storing the base models whose design variables have been changed and a base model whose design variables have not been changed; repeating the storing step until the number of the stored base models reaches a predetermined number; determining whether a new group comprising the stored base models of the predetermined number satisfies a predetermined convergence condition; wherein if not, the new group is defined as the group for selection until the group for selection defined satisfies the predetermined convergence condition; and if the predetermined convergence condition is satisfied, designing a tire based on the design parameter of the tire obtained by the design variable, which gives the optimum value of the objective function, among the predetermined number of the stored base models by using the corresponding relation while considering the constraint condition.